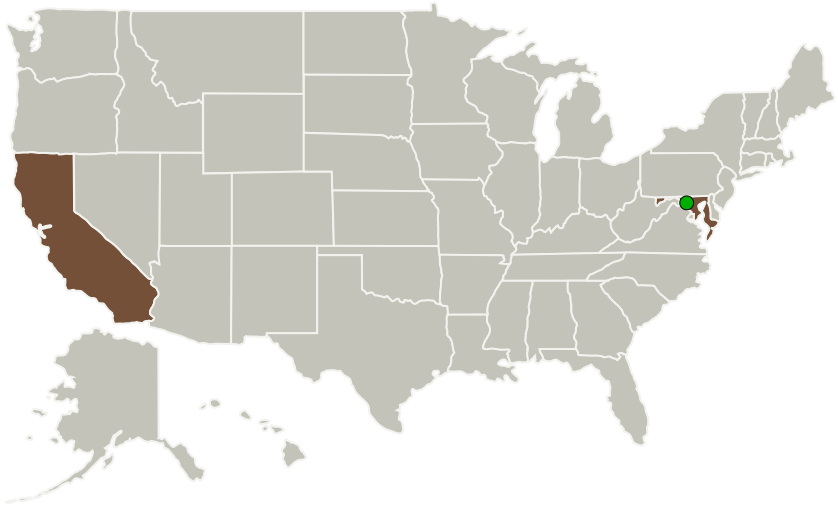
X-ray Detection and Processing Models for Spacecraft Navigation and Timing, Phase I

Completed Technology Project (2010 - 2010)

Project Introduction

Based on work done under Microcosm's recently completed Phase II SBIR program on X-ray pulsar based navigation (XNAV), relevant X-ray source characterization, X-ray detector measurement models, and source timing models will be developed to support eventual implementation in the GEONS flight software environment. In Phase I, an initial assessment will be made of the key model parameters and accuracy of time determination. Microcosm has recently been awarded a contract by DARPA to assess the potential for XNAV as a precision timing source for DoD missions. This work will be evaluated in Phase I for the potential to provide a precise, independent, X-ray pulsar-based time reference for NASA missions as well. The team will work with the Naval Research Lab, JHU/Applied Physics Lab, and NASA GSFC, focusing on sources and detectors to develop enhanced models, and assessing potential timing accuracy. Development of pulsar signal processing methods and prototype algorithms will continue, incorporating new source and detector models. This work, along with the previous Phase II effort, will further validate the utility of XNAV for NASA, and provide sufficient development and testing of relevant technology to provide a rapid path to a full flight software development in a Phase II program.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Microcosm, Inc.	Lead Organization	Industry Women-Owned Small Business (WOSB)	Hawthorne, California
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
California	Maryland

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139976)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Microcosm, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

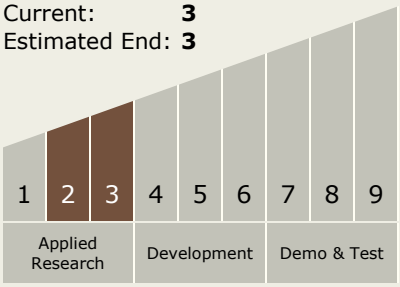
Carlos Torrez

Principal Investigator:

Paul Graven

Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX05 Communications, Navigation, and Orbital Debris Tracking and Characterization Systems
  - TX05.4 Network Provided Position, Navigation, and Timing
    - TX05.4.2 Revolutionary Position, Navigation, and Timing Technologies

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System